

the leaf to dry in the air, remove the area desired from the balance of the leaf, and place in a killing fluid. The best combined killing and tissue-clearing mixture for this purpose is one recommended by Dr. Duggar, composed of glacial acetic acid and 95 per cent alcohol. I have used equal parts of these agents most advantageously. This dissolves the chlorophyll, renders the leaf transparent or nearly so, and at the same time fixes the fungus with little plasmolysis. Allow the killing mixture to act for 24-36 hours; wash in 50 or 70 per cent alcohol, to remove the acid; and pass successively through the stain (15-30 minutes), water (2 minutes), acid alcohol (as short a time as possible), carbol-turpentine (until clear), xylol (until clearing agent is removed), and then mount in balsam. This process of differential staining has been successfully used with *Ascochyta Pisi* on pea, *Helminthosporium sativum* on barley, and *Phoma Brassicæ* on cabbage.

Pianeze's stain has not given as good results with the rusts as Durand's combination of Delafield's haematoxylin and eosin. Durand's stain¹ was not uniformly successful, however, and it was found that one of the chief difficulties often experienced finds its explanation in the killing solution which the stain follows. Flemming's solution, which was first used, gave very poor results. A modification of Gilson's mercuric chloride solution was found most satisfactory. This solution, as recommended by Dr. Durand, is made up as follows:

Water, distilled	60 cc.
Alcohol, 95 per cent	42 cc.
Acetic acid, glacial	18 cc.
Nitric acid, concentrated	2 cc.
Mercuric chloride, sat. aq. sol.	11 cc.

Diseased tissue may be fixed from 6 to 24 hours, then washed in 65 per cent alcohol, run through the alcohols, infiltrated with cedar oil, and imbedded in paraffin. This method is undesirable for nuclear structures, but gives excellent preparations for gross histological work.

Graduate Laboratory, Missouri Botanical Garden.

¹ Durand, E. J. The differential staining of intercellular mycelium. *Phytopathology* 1: 129-30. 1911.

TWO TRUNK DISEASES OF THE MESQUITE

HERMANN VON SCHRENK

Pathologist to the Missouri Botanical Garden

The diseases of the mesquite (*Prosopis glandulosa* Torr.) hitherto recorded are comparatively few in number; Heald and Wolf (5) enumerate seven from southern Texas as due to fungi. The pods are frequently affected by an anthracnose, *Glæosporium leguminum* (Cke.) Sacc.; the leaves are attacked by *Cercospora prosopidis* Heald and Wolf, a species of powdery mildew (*Erysiphe* ?), and by a rust, *Ravenelia arizonica* Ell. & Ev.; and a leaf blight due to some unknown cause is also mentioned. The large limbs and smaller branches show galls, evidently not due to insect attack, and the mistletoe (*Phoradendron flavescens* (Pursh) Nutt. is sometimes destructive. In addition to the above, the writer has frequently noted the weakening effect, particularly near the ends of branches, brought about by vigorous growths of the ball moss (*Tillandsia recurvata* L.). Birge (1) has given a good description of the effects of this plant on trees in Texas.

Of the insect injuries of the mesquite, that of the mesquite borer (*Cyllene antennatus* White) is of interest. The insect is described by Horn (6) as attacking mesquite wood in Arizona, but no description of its work is given. While I have not seen the insect at work in Texas, the holes found in the mesquite trees are so like those described for other species of *Cyllene*, notably *Cyllene robiniaë* Forster (10)—which attacks the locust—that the assumption seems warranted that the Texas insect is the one referred to by Horn. The tunnels extend straight through the bark into the heart-wood, and up and down in the latter, thus forming ideal channels for the entrance of fungous spores.

The only reference to trunk diseases which has been found is a brief statement by Havard (4), in an account of the mesquite, in which he mentions that "unfortunately it too often happens that the zones of the heart-wood are fissured, decayed or de-